



Department of Energy

Idaho Operations Office
850 Energy Drive
Idaho Falls, Idaho 83401-1563
October 3, 2001

Mr. Wayne Pierre, Team Leader
Environmental Cleanup Office
U.S. Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle, Washington 98101

Mr. Dean Nygard, Site Remediation Program Manager
Idaho Department of Environmental Quality
Waste Management and Remediation Program
1410 N. Hilton
Boise, Idaho 83706

SUBJECT: On-Site versus Off-Site Soil and Debris Disposal Cost Comparison
(EM-ER-01-160)

Dear Mr. Pierre and Mr. Nygard:

This letter and enclosure update the cost of on-site disposal at the INEEL CERCLA Disposal Facility (ICDF) Complex and off-site disposal at a commercial disposal facility for CERCLA-contaminated soils and debris at the INEEL. In the Operable Unit (OU) 3-13 Record of Decision (ROD) and the OU 3-13 Remedial Design/Remedial Action Scope of Work, the cost of on-site and off-site disposal was to be re-evaluated as the project progressed and prior to the excavation of Waste Area Group 3 contaminated soils (Group 3, Other Surface Soils) for disposal. Re-evaluations of the cost and cost estimates have been prepared and are included in this letter and attachment. These re-evaluations and cost estimates are based on the ICDF 30% design and the draft Staging, Storage, Sizing, and Treatment Facility (SSSTF) Remedial Design/Remedial Action Work Plan (RD/RA WP).


The cost of on-site disposal at the ICDF Complex has been significantly reduced from the estimate in the Feasibility Study (FS) Supplement Report, on which the OU 3-13 ROD was based. In the FS Supplement Report, the cost for the on-site disposal facility, including design, construction, operation, and closure, was estimated at \$236M, which also includes a 30% contingency. Without the 30% contingency, the cost for on-site disposal is \$181M. The current estimate for on-site disposal at the ICDF Complex is \$79.6M, which also includes design, construction, operation, closure, and long-term monitoring. Off-site disposal in the FS Supplement Report was estimated at \$713M, which includes a 30% contingency. Without contingency, the cost in the FS Supplement Report was estimated at \$548M and is currently estimated at \$465M. All estimates provided in this letter report do not have contingency applied to them.

For on-site disposal, the cost of disposal has been reduced from \$390 per cubic yard (based on a disposal volume of 465,300 cubic yards as given in the FS Supplement) to \$165 per cubic yard (based on the current estimated volume of 483,800 cubic yards). Based on the design volume of 510,000 cubic yards, the costs have been reduced from \$355 per cubic yard to \$156 per cubic yard. This is a reduction of 56% from the FS Supplement Report to the current estimate, which is based on the ICDF 30% design and draft SSSTF RD/RA WP documents.

In the case of off-site disposal, the cost of disposal has been reduced from \$1,179 per cubic yard to \$961 per cubic yard. This is a cost reduction of 15% for disposal of the expected waste types (see Attachment, Table 2, for these waste types) versus the General Accounting Office (GAO) estimated cost reduction of 22% for disposal of low-level waste.

This analysis shows that the ratio of cost between off-site versus on-site disposal has increased from approximately three times more expensive for off-site at the time the FS Supplement was issued to approximately six times more expensive today. The cost of off-site disposal could possibly be further reduced, but this would require additional characterization data and different assumptions concerning the waste types. However, it is not conceivable that the cost of off-site disposal could be reduced to the current cost of on-site disposal at the ICDF Complex. If you have any questions, please call Talley Jenkins at (208) 526-4978 or myself at (208) 526-4392.

Sincerely,



Kathleen Hain, Manager
Environmental Restoration Program

Enclosure

Cc: M. English, IDHW, DEQ, Community Programs, 1410 N. Hilton, Boise, Idaho 83706
T. Kluk, DOE-HQ, EM-441
R. Cummings, DOE-HQ, EM-441

On-Site Versus Off-Site Soil and Debris Disposal Comparison for the ICDF Complex

Published October 2001

On-site Versus Off-Site Soil and Debris Disposal Comparison for the ICDF Complex

1. INTRODUCTION

This report reevaluates the estimated costs for (1) on-site disposal of Idaho National Engineering and Environmental Laboratory (INEEL) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) soils and debris at the INEEL CERCLA Disposal Facility (ICDF) and (2) off-site disposal at a commercial disposal facility. In evaluating the remedial action alternatives in the Operable Unit (OU) 3-13 Feasibility Study (FS) Supplement Report (DOE-ID 1998a), cost estimates were developed for both on-site and off-site disposal alternatives. This cost information, along with the other evaluation criteria, was presented in the OU 3-13 Proposed Plan (DOE-ID 1998b). During the public comment period on the OU 3-13 Proposed Plan, comments dealing with the cost of on-site versus off-disposal were submitted for consideration in development of the OU 3-13 Record of Decision (ROD) (DOE-ID 1999).

In the OU 3-13 ROD, on-site disposal at the ICDF was selected as a component of the remedial action for dealing with some of the contaminated surface soils that exceed risk-based contaminant concentrations. These surface soils are referred to in the OU 3-13 ROD as Other Surface Soils (Group 3). In addition, as discussed in Section 11.1.3 of the OU 3-13 ROD, the ICDF is intended to "...function as an INEEL-wide disposal facility to accommodate disposal of CERCLA soils and debris...."

The OU 3-13 ROD also contained a requirement to evaluate the "...life cycle cost effectiveness of on- or off-site disposal and compliance with DOE policy...." This requirement was included in the OU 3-13 ROD to make sure that on-site disposal at the ICDF is the cost-effective option in comparison to off-site disposal. In addition, the Department of Energy's (DOE's) current policy (DOE 1999) is to utilize on-site disposal capacity preferably to off-site disposal capacity at commercial disposal facilities.

Two recent General Accounting Office (GAO) reports (GAO 2000 and GAO 2001) consider the cost-effectiveness of on-site versus off-site disposal. In the GAO report titled *Nuclear Cleanup, DOE Should Reevaluate Waste Disposal Options Before Building New Facilities* (GAO 2001), the GAO stated that the cost of off-site disposal could be reduced. From this report, GAO estimated that the cost of off-site disposal could be reduced by 22% provided that the waste being considered for off-site disposal was only low-level waste and was able to meet the off-site disposal facilities' waste acceptance criteria.

This report discusses several issues that contribute to on-site and off-site disposal costs. The volume and characteristics of the various waste streams destined for the ICDF landfill have changed since the analysis that was conducted for the OU 3-13 FS Supplement Report, on which the OU 3-13 ROD was based. Also, the layout and configuration of the ICDF Complex facilities including the ICDF landfill, have changed based on the ICDF 30% design (DOE-ID 2001a) and as identified in the draft Staging, Storage, Sizing, and Treatment Facility (SSSTF) Remedial Design/Remedial Action Work Plan (RD/RA WP) (DOE-ID 2001b). These issues, in addition to the requirements in the OU 3-13 ROD and GAO reports, are the basis for conducting this reevaluation of the cost of on-site disposal versus off-site disposal.

This report is organized as follows:

Section 2 discusses the classification of waste streams from the release sites and deactivation, decommissioning, and dismantlement (D&D&D) projects being considered for disposal in the ICDF landfill. There have been changes in our knowledge of the contaminants and media types from the release sites between the publication of the OU 3-13 FS Supplement Report (Appendix A) (October 1998), on which the OU 3-13 ROD was based, and the current inventory included in the ICDF 30% design (DOE-ID 2001a).

Section 3 presents the volumes of each waste type for the release sites and D&D&D projects being considered for disposal in the ICDF landfill. There have been changes in the release sites waste classifications and expected volumes between the publication of the OU 3-13 FS Supplement Report (Appendix B), on which the OU 3-13 ROD was based, and the current inventory included in the ICDF 30% design (DOE-ID 2001a).

Section 4 presents a summary of the cost estimate for on-site disposal using the ICDF Complex. There have been significant changes in the cost estimates for on-site disposal between the publication of the OU 3-13 FS Supplement Report (Appendix D), on which the OU 3-13 ROD was based, and the current cost estimate presented in Section 4 and Appendix C.

Section 5 presents a summary of the cost estimate for off-site disposal at a commercial disposal facility. There have been significant changes in the cost estimates for off-site disposal between the publication of the OU 3-13 FS Supplement Report (Appendix F), on which the OU 3-13 ROD was based, and the current cost estimate presented in Section 5 and Appendix E.

Section 6 presents conclusions and comparisons between the estimated cost of disposal at the ICDF Complex and off-site based on the cost estimates presented in Sections 4 and 5. In addition, Section 6 also provides a comparison of the cost of on-site and off-site disposal based on the OU 3-13 FS Supplement Report cost estimates.

2. RELEASE SITE WASTE CLASSIFICATIONS

For the analysis of the waste classifications, some additional analysis beyond the information and analysis in the OU 3-13 FS Supplement Report was conducted. In the OU 3-13 FS Supplement Report, the classification of waste was based on several criteria. Waste streams from INEEL CERCLA release sites waste streams were classified using a combination of process knowledge and analytical data. Release sites were classified as low-level waste (LLW), based on analytical data showing radionuclides to be present in the release site exceeding INEEL background concentrations. In the case of hazardous waste classifications, release sites were classified as being hazardous waste (haz waste) if the analytical data showed that the waste was characteristic for Resource Conservation and Recovery Act (RCRA) metals as demonstrated by Toxic Characteristic Leaching Procedure (TCLP) results. If no TCLP results were available, the 20X rule was applied to the maximum concentrations for the RCRA metals in the waste stream, and waste streams exceeding the 20X concentrations were classified as potentially hazardous waste. Also, if the release site was associated with a process having listed waste, the listed hazardous waste codes were applied to the release site, making the waste potentially hazardous waste. For waste streams that contained both radionuclides and hazardous waste components, the waste stream was classified as a mixed low-level waste (MLLW). For the waste expected to be generated by the D&D&D projects, the D&D&D Parametric Model was used. (DOE-ID 2000b)

In the CERCLA Waste Inventory Database (CWID) Report (DOE-ID 2000b), 40 sites are identified for disposal in the ICDF landfill. These release sites are from Waste Area Group (WAG) 1 (Test Area North [TAN], which includes the Technical Support Facility [TSF] and the Water Research Reactor Test Facility [WRRTF]); WAG 3 (Idaho Nuclear Technology and Engineering Center [INTEC], formerly known as the Chemical Processing Plant [CPP]); WAG 4 (Central Facilities Area [CFA]); WAG 5 (Auxiliary Reactor Area [ARA]); and WAG 10 (Boiling Water Reactor Experiment [BORAX]). In addition, the OU 3-14 remedial investigation (RI) is expected to generate investigation-derived waste (IDW) soils which are being considered for disposal at the ICDF landfill. This soil volume is expected to be generated primarily from the investigation of release sites CPP-28 and CPP-31. These revised characteristics and estimates of waste volumes for disposal are being used to update the cost estimates for on-site and off-site disposal.

The new analysis essentially used the same criteria as the OU 3-13 FS Supplement Report, discussed above. However, for the evaluation of potential hazardous characteristics for sites lacking TCLP results, the maximum concentrations from the CWID Report were used in the assessment of the RCRA 20X rule. Also, for the D&D&D projects, the D&D&D Parametric Model continued to be used. However, the information provided in the CWID Report for D&D&D did not distinguish between the various WAGs and was updated for this analysis of the waste characterization. The current information regarding contaminants and types for the release sites and D&D&D projects is presented in Table 1. Appendix A contains the information on contaminants and types used for the OU 3-13 FS Supplement Report.

3. RELEASE SITE WASTE VOLUMES

In developing the OU 3-13 FS Supplement Report, an expected volume of contaminated soils and debris of 465,312 yd³ was identified as requiring disposal. This volume did not account for any swell due to excavation and recompaction. For sizing purposes and to account for some swell, a disposal volume of 510,000 yd³ was authorized in the OU 3-13 ROD. For the volumes used in the CWID Report, the size of the WAG 3 release sites contained in the OU 3-13 ROD was used. In the case of the other WAGs release sites, the volumes were obtained from personnel working on the various projects. Using the information from the current inventory in the CWID Report, a volume of 483,800 yd³ (see Table 2) without swell (from excavation/recompaction expansion, contingency, or increase due to treatment) is required to meet the identified waste stream projections. This information supports the ICDF landfill being designed and constructed based on the OU 3-13 ROD-authorized volume of 510,000 yd³.

As the ICDF was authorized in the OU 3-13 ROD to dispose of INEEL CERCLA wastes, waste from other projects on the INEEL could be a candidate for disposal in the ICDF if the waste was generated from a CERCLA action.

Table 1. Contaminates and media type present at the release sites based on characteristics and process knowledge.

Release Site	Radio-nuclides	Listed Constituents	Potentially Characteristic							Comments
			Cd	Cr	Pb	Ag	Hg	Organics	PCB	
ARA-01	X									
ARA-12	X		X	X	X	X				
ARA-23	X									
ARA-25	X				X					
BORAX-01	X		X	X	X	X	X			
BORAX-08	X									
CFA-04			X			X				Estimated 800 yd ³ does not meet TCLP values for Hg; remainder of site exceeds risk-based concentrations
CPP-01/04/05	X									
CPP-03	X									
CPP-08/09	X									
CPP-10	X									
CPP-11	X									
CPP-13	X	X								
CPP-14	X				X	X				
CPP-19	X									
CPP-34	X	X			X					
CPP-35	X	X								
CPP-36/91	X	X								
CPP-37A	X									
CPP-37B	X							X	X	Soil (75%) and debris (25%)

Table 1. (continued).

Release Site	Radio-nuclides	Listed Consti-tuents	Potentially Characteristic							Comments
			Cd	Cr	Pb	Ag	Hg	Organics	PCB	
CPP-44			X		X					
CPP-48	X									
CPP-55										Metals-contaminated soil exceeding risk-based concentrations
CPP-67	X	X ^a					X			
CPP-69	X									Soil (5%) and debris (95%)
CPP-92	X	X								Soil (87%) and debris (13%)
CPP-93								X		
CPP-97	X	X								
CPP-98	X	X								Soil (12%) and debris (88%)
CPP-99	X	X								Soil (24%) and debris (76%)
TF CPP-28 IDW	X	X								
TF CPP-31 IDW	X	X								
TSF-03										Metals-contaminated soil exceeding risk-based concentrations
TSF-06	X	X								
TSF-07	X									
TSF-09/18	X	X								
TSF-26	X	X								
WRRTF-01	X		X	X	X					

Table 1. (continued).

Release Site	Radio-nuclides	Listed Constituents	Potentially Characteristic							Comments
			Cd	Cr	Pb	Ag	Hg	Organics	PCB	
WAG 1 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
WAG 2 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
WAG 3 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
WAG 4 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
WAG 5 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
WAG 6 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
WAG 7 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
WAG 10 D&D&D										Contaminated debris with classification of waste streams based on the D&D&D Parametric Model
a. Potentially listed waste										

Table 2. Waste type volumes for the release sites and D&D&D projects based on the classification of waste streams.^a

Release Site	Volume (yd ³)	Volume LLW Soils (yd ³)	Volume MLLW Soils (yd ³)	Volume Nonhaz- ardous Waste Soils (yd ³)	Volume Hazardous Waste Soils (yd ³)	Volume LLW Debris (yd ³)	Volume MLLW Debris (yd ³)	Volume Hazardous Waste Debris (yd ³)
ARA-01	2,382	2,382	—	—	—	—	—	—
ARA-12	1,966	—	1,966	—	—	—	—	—
ARA-23	46,500	46,500	—	—	—	—	—	—
ARA-25	71	—	71	—	—	—	—	—
BORAX-01	11,110	—	11,110	—	—	—	—	—
BORAX-08	131	131	—	—	—	—	—	—
CFA-04	8,355	—	—	7,555	800	—	—	—
CPP-01/04/05	4,260	4,260	—	—	—	—	—	—
CPP-03	10,940	10,940	—	—	—	—	—	—
CPP-08/09	3,100	3,100	—	—	—	—	—	—
CPP-10	422	422	—	—	—	—	—	—
CPP-11	1,491	1,491	—	—	—	—	—	—
CPP-13	4,022	—	4,022	—	—	—	—	—
CPP-14	11,046	—	11,046	—	—	—	—	—
CPP-19	3,780	3,780	—	—	—	—	—	—
CPP-34	27,352	—	27,352	—	—	—	—	—
CPP-35	311	—	311	—	—	—	—	—
CPP-36/91	12,520	—	12,520	—	—	—	—	—
CPP-37A	10,889	10,889	—	—	—	—	—	—
CPP-37B	102,439	—	76,829	—	—	—	25,610	—
CPP-44	89	—	—	—	89	—	—	—
CPP-48	296	296	—	—	—	—	—	—
CPP-55	370	—	—	370	—	—	—	—
CPP-67	99,260	—	99,260	—	—	—	—	—
CPP-69	61	3	—	—	—	58	—	—
CPP-92	1,370	—	1,197	—	—	—	173	—
CPP-93	2,667	—	—	—	2,667	—	—	—
CPP-97	1,500	—	1,500	—	—	—	—	—

Table 2. (continued).

Release Site	Volume (yd ³)	Volume LLW Soils (yd ³)	Volume MLLW Soils (yd ³)	Volume Nonhaz- ardous Waste Soils (yd ³)	Volume Hazardous Waste Soils (yd ³)	Volume LLW Debris (yd ³)	Volume MLLW Debris (yd ³)	Volume Hazardous Waste Debris (yd ³)
CPP-98	250	—	30	—	—	—	220	—
CPP-99	126	—	30	—	—	—	96	—
TF CPP-28 IDW	40	—	40	—	—	—	—	—
TF CPP-31 IDW	40	—	40	—	—	—	—	—
TSF-03	1,074	—	—	1,074	—	—	—	—
TSF-06	8,181	—	8,181	—	—	—	—	—
TSF-07	1	1	—	—	—	—	—	—
TSF-09/18	4,365	—	4,365	—	—	—	—	—
TSF-26	10,216	—	10,216	—	—	—	—	—
WRRTF-01	20,070	—	20,070	—	—	—	—	—
WAG 1 D&D&D	5,217	—	—	—	—	5,211	4	1
WAG 2 D&D&D	6,840	—	—	—	—	6,835	4	1
WAG 3 D&D&D	38,766	—	—	—	—	38,719	37	9
WAG 4 D&D&D	0	—	—	—	—	—	—	—
WAG 5 D&D&D	13,967	—	—	—	—	13,954	10	3
WAG 6 D&D&D	0	—	—	—	—	—	—	—
WAG 7 D&D&D	5,948	—	—	—	—	5,943	3	2
WAG 10 D&D&D	0	—	—	—	—	—	—	—
Total	483,800	84,195	290,156	8,999	3,556	70,721	26,156	17

— = No waste type at this location.

a. Source: DOE-ID (2000b).

b. Totals not exact due to rounding.

In developing the waste inventories, seven different waste types have been identified and are used for the classification of the waste streams and associated volumes requiring either on-site or off-site disposal. These seven waste types include the traditional waste types of low-level waste (LLW), mixed low-level waste (MLLW), and hazardous waste (haz waste) for both soils and debris. In addition, one waste type identified is driven by the calculation of unacceptable risk from nonradionuclides and is referred to in this cost evaluation report as nonhazardous waste (nonhaz waste). These seven waste types are generally described as follows:

- | | |
|---------------------|---|
| LLW soils: | Soils from the INEEL that have been contaminated with radionuclide concentrations exceeding the INEEL background values and that present an unacceptable risk to human health and the environment. LLW is waste that cannot be defined as high-level radioactive waste, spent nuclear fuel, transuranic (TRU) waste, by-product material [as defined in Section 11e (2) of the Atomic Energy Act of 1954, as amended] (42 USC 2011, et seq.), or naturally occurring radioactive material (DOE Order 435.1). |
| MLLW soils: | Soils from the INEEL that have been contaminated with radionuclide concentrations exceeding the INEEL background values that present an unacceptable risk to human health and the environment. MLLW is waste that meets the criteria for LLW, given above, and that contains hazardous components as defined by 40 CFR 262. |
| Haz waste soils: | Soils from the INEEL that have been contaminated with waste that is designated as hazardous by EPA regulations (40 CFR 261.3) and that contains the hazardous components as defined by 40 CFR 262. |
| Nonhaz waste soils: | Soils from the INEEL that have been contaminated with chemical contaminants that are not RCRA listed waste constituents or at concentrations exceeding RCRA characteristic levels. These are soils that must be remediated based on the calculated risks from the chemical contaminants. In addition, radionuclides may be present at or below INEEL background concentrations. |
| LLW debris: | Debris materials from the INEEL that have been contaminated with radionuclide concentrations exceeding the INEEL background values and that present an unacceptable risk to human health and the environment. LLW is waste that cannot be defined as high-level radioactive waste, spent nuclear fuel, transuranic (TRU) waste, by-product material [as defined in Section 11e (2) of the Atomic Energy Act of 1954, as amended] (42 USC 2011, et seq.), or naturally occurring radioactive material (DOE Order 435.1). |
| MLLW debris: | Debris materials from the INEEL that have been contaminated with radionuclide concentrations exceeding the INEEL background values and that present an unacceptable future risk to human health and the environment. MLLW is waste that meets the criteria for LLW, given above, and that contains hazardous components as defined by 40 CFR 262. |
| Haz waste debris: | Debris materials from the INEEL that have been contaminated with waste that is designated as hazardous by EPA regulations (40 CFR 261.3) and that contains the hazardous components as defined by 40 CFR 262. |

4. ON-SITE DISPOSAL COST ESTIMATE

The cost estimate for on-site disposal is comprised of five major cost elements or phases. These major cost elements are (1) capital costs, (2) operations costs, (3) closure costs, (4) post-closure costs, and (5) other costs. Each of these major cost elements has sub-element cost components. For this analysis, cost estimates are presented in terms of the major cost elements. The detailed cost estimate for on-site disposal, including the sub-element cost components, is presented in Appendix C.

This cost estimate is based on the ICDF 30% design (DOE-ID 2001a) and the draft SSSTF RD/RA WP. There are several major components that comprise the ICDF Complex: (1) road work, (2) utilities, (3) administration facility, (4) scales facility, (5) decontamination facility, (6) treatment equipment, (7) ICDF landfill cells, (8) ICDF evaporation pond, and (9) a waste tracking system.

The road work consists of constructing a new road from Lincoln Boulevard to the INTEC perimeter road and into the ICDF Complex. The utility work consists of installation of the water, sewer, communications, and fire protection from INTEC to the ICDF Complex and the installation of electrical power from overhead power lines into the ICDF Complex. The administration facility is a small modular building that will contain offices, a conference room, waste tracking equipment, and restroom facilities. A scale large enough to weigh a loaded truck at one time composes the scale facility. The decontamination facility is a preengineered metal building that will be used for decontamination of equipment, change rooms, restroom facilities, and housing of both the soil stabilization and debris treatment operations. The treatment equipment is the soil stabilization equipment. The ICDF landfills cells consist of an expandable landfill cell that, when completed, will have a disposal capacity of 510,000 yd³. The ICDF evaporation pond is sized to deal with the expected leachate from the ICDF landfill cells and other liquid waste streams. The waste tracking system, which is part of the administration facility, is being developed to track the waste through the ICDF Complex, for inventory control, and for compliance with the waste acceptance criteria at the ICDF Complex. Figure 1 shows the layout of the ICDF Complex.

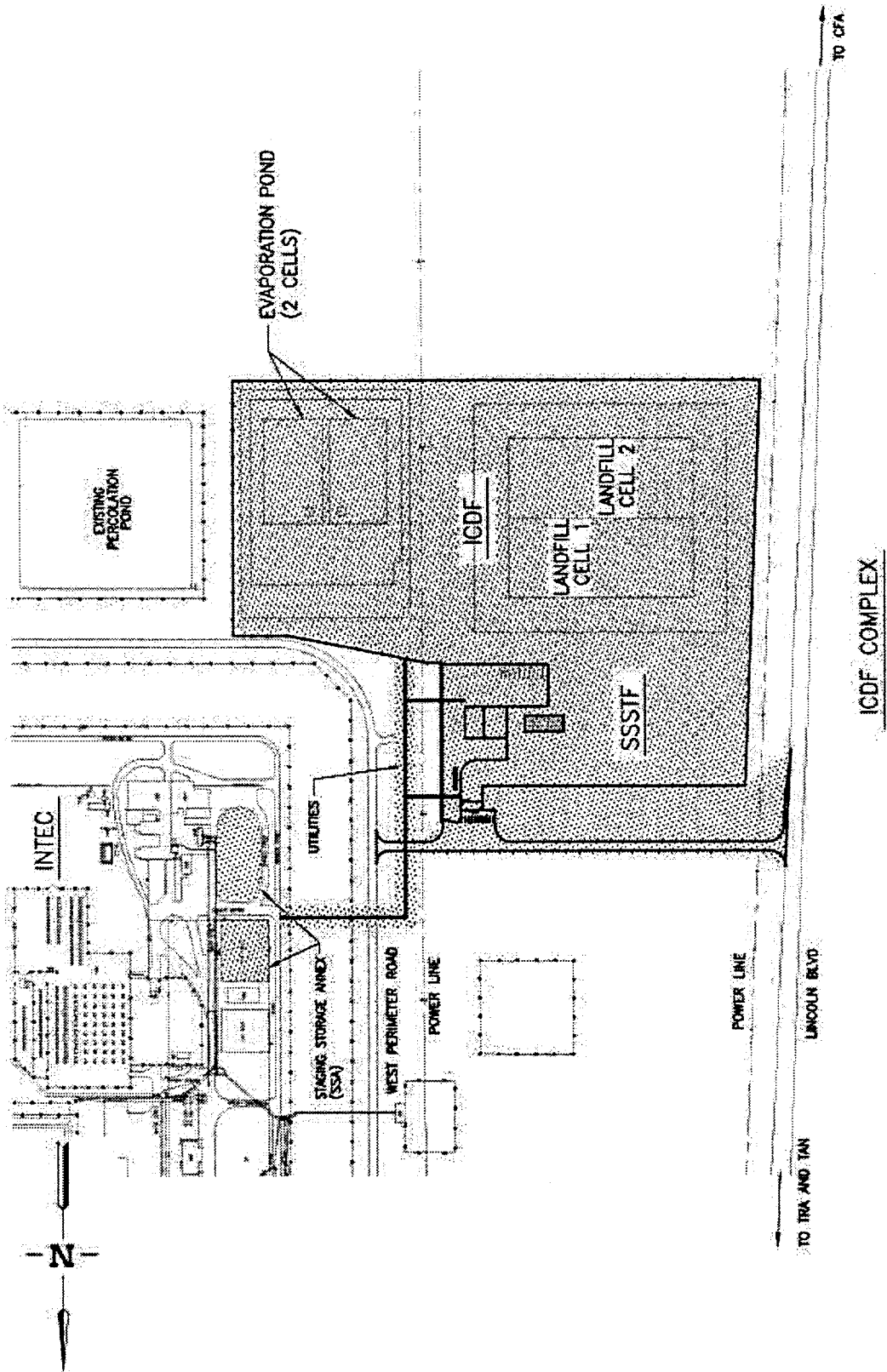


Figure 1. Plain view layout drawing showing the major facilities that compose the ICDF Complex x.

In the cost estimate for on-site disposal at the ICDF Complex, the cost items have been arranged into five major cost items for the cost estimate. The scope of each of these five major cost items is discussed below. The cost estimate is based on the projects being implemented composing the ICDF Complex based on the ICDF 30% design (DOE-ID 2001a) and draft SSSTF RD/RA WP along with their associated cost estimates. The scope of the five major cost elements is discussed below.

- Capital costs: These include the project documentation (RD/RA SOW, design document, waste acceptance criteria, etc.), procurement, work authorization, construction, quality assurance/quality control, and project management necessary for the construction of the various facilities composing the ICDF Complex.
- Operations costs: These include the startup of the facilities, equipment used for ICDF Complex operations, ICDF Complex operations (ICDF landfill and evaporation ponds operations, leachate management, and 10 years of treatment operations), records maintenance, and project management necessary to operate the ICDF Complex in compliance with the design and operational requirements.
- Closure costs: These include the D&D&D of the SSSTF facilities, constructing an engineered containment barrier (cap) over the ICDF landfill cells, and the project management necessary to close the facilities in compliance with the design and closure requirements. (about 2 years)
- Post-closure costs: These include aquifer monitoring (sampling and analysis) for 100 years, leachate monitoring management (removal, storage, treatment, and disposal) for 30 years, and project management necessary to implement these programs.
- Other costs: These include program management necessary to implement a project at the INEEL for a duration of 100 years.

These summary-level cost elements are presented in Table 3. Details concerning the cost elements and sub-elements are presented in Appendix C along with additional assumptions used to develop the cost estimate.

Table 3. Summary cost estimate for on-site disposal at the ICDF Complex, including the five major cost elements along with the total estimated cost for on-site disposal.

Cost Elements	Current Cost Estimate (2001 dollars)
Capital	
Design	\$8,451,000
Construction	\$23,176,000
Operations total	\$21,486,000
Closure total	\$9,969,000
Post-closure total	\$7,995,000
Other cost total	\$8,550,000
Grand total	\$79,627,000

5. OFF-SITE DISPOSAL COST ESTIMATE

The cost estimate for off-site disposal is comprised of five major cost elements or phases. These major cost elements are (1) capital costs, (2) operations costs, (3) closure costs, (4) post-closure costs, and (5) other costs. Each of these major cost elements has sub-element cost components. For this analysis, cost estimates are presented in terms of the major cost elements. The detailed cost estimate for off-site disposal, including the sub-element cost components is presented in Appendix E.

This cost estimate is based on the draft SSSTF RD/RA WP. In conducting the cost analysis for the on-site disposal remedy, several of the issues and functions necessary for handling the waste are applicable to either on- or off-site disposal. Using the information and cost estimates from the on-site disposal project along with other assumptions, a cost estimate for off-site disposal has been developed.

There are several major components that would comprise an off-site shipping facility: (1) road work, (2) utilities, (3) administration facility, (4) scales facility, (5) decontamination facility, (6) railroad spur, and (7) a waste tracking system.

The road work consists of constructing a new road from Lincoln Boulevard to the INTEC perimeter road and into the ICDF Complex. The utility work consists of installation of the water, sewer, communications, and fire protection from INTEC to the ICDF Complex and the installation of electrical power from overhead power lines into the ICDF Complex. The administration facility is a small modular building that will contain offices, a conference room, waste tracking equipment, and restroom facilities. A scale large enough to weigh either a loaded railroad gondola car or a loaded truck at one time composes the scale facility. The decontamination facility is a preengineered metal building that will be used for decontamination of equipment, change rooms, and restroom facilities. (Note: show cost difference between truck and rail) A railroad spur would be dedicated to loading and shipping waste off-site by railroad cars. The waste tracking system, which is part of the administration facility, is being developed to track the waste through the ICDF Complex, for inventory control, and for compliance with the waste acceptance criteria of the off-site disposal facilities. Figure 2 shows the conceptual layout of the off-site shipping facility.

The cost estimate for off-site disposal is comprised of the same five major cost elements as the estimate for on-site disposal at the ICDF Complex. The scope of each of these five major cost items is discussed below. The cost estimate is based on the projects being implemented as described in the draft SSSTF RD/RA WP along with the associated cost estimates. The scope of the five major cost elements is discussed below.

Capital costs : These include the project documentation (RD/RA SOW, design document, waste acceptance criteria, etc.), procurement, work authorization, construction, quality assurance/quality control, and project management necessary for the construction of the various facilities (administration facility, decontamination facility, loadout facility [large concrete pads], etc.) composing the off-site shipping facility.

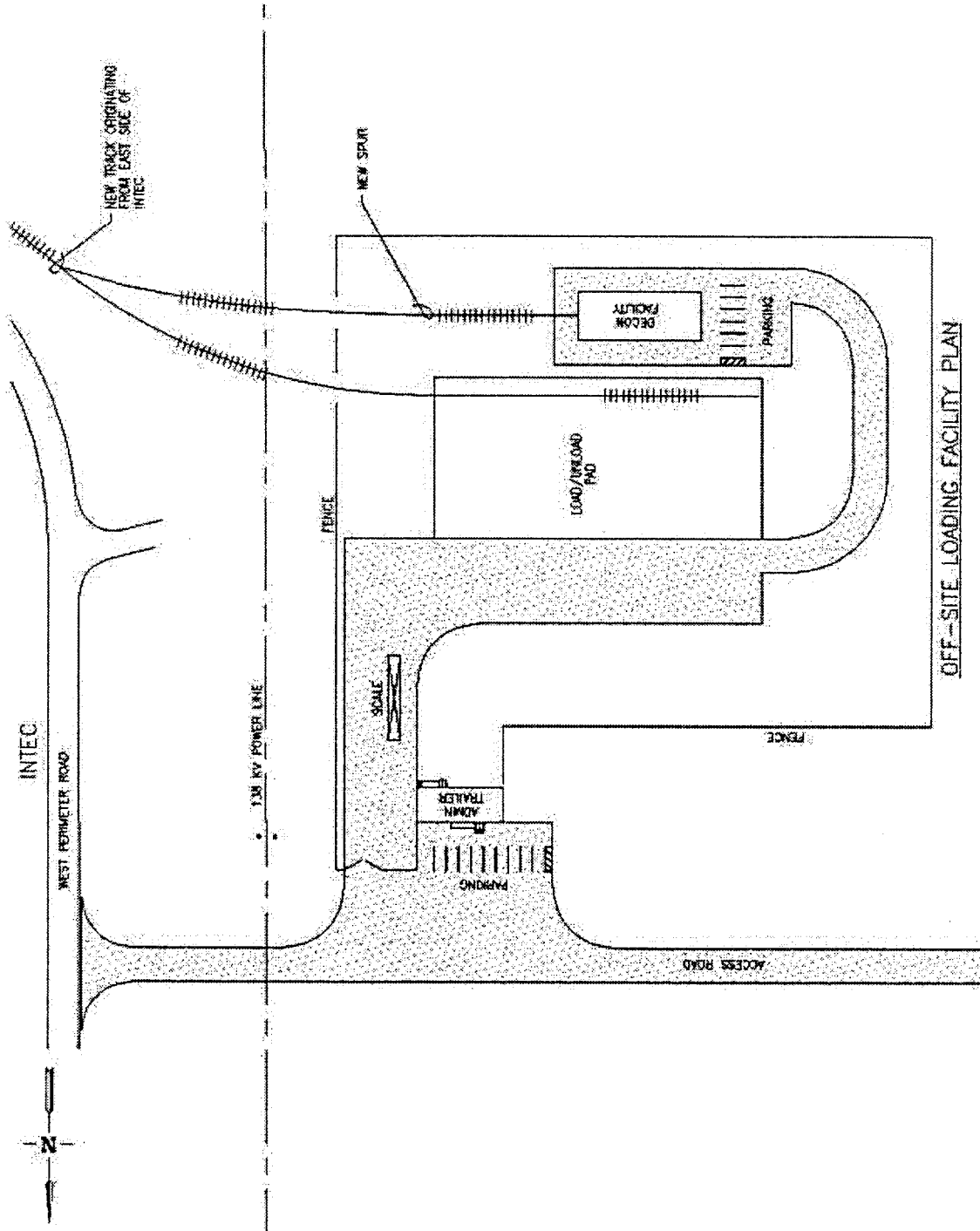


Figure 2. Plan view conceptual layout drawing showing the major facilities that would comprise the off-site shipping facility.

Operations costs: These include the startup of the facilities, equipment used for off-site shipping facility, off-site shipping facility operations (loading, sampling, transportation to the off-site disposal facility, and disposal at the off-site disposal facility), records maintenance, and project management necessary to operate the off-site shipping facility in compliance with the expected design and operational requirements.

It should be noted that during the development of the OU 3-13 ROD, the reevaluation of cost would use the existing contract without speculation as to what new rates could be negotiated for off-site disposal.

In developing the current updated cost estimate for off-site disposal, an existing contract with Envirocare (Envirocare 1998) and set of rates received from Jeff Shadley, DOE-ID, (Shadley 2001) based on other existing contracts were used. In this contract, there are various unit rates for disposal of different types of wastes. For transportation rates, an existing report (LMITCO 1995) was used. In this document, there are different rates for different modes of transportation (rail or truck). The rate for truck is much larger than for rail with a destination of the off-site disposal facility considered (Envirocare). As such, the updated cost estimate for off-site uses the rail transportation rate.

Closure costs: These include the D&D&D of the off-site shipping facilities and the project management necessary to close the facilities in compliance with the design and closure requirements. D&D&D of the rail spur was not included.

Post-closure costs: No post-closure costs were included for the off-site shipping facility.

Other costs: These include program management necessary to implement a project at the INEEL for a duration of 15 years.

These summary-level cost elements are presented in Table 4. Details concerning the cost elements and sub-elements are presented in Appendix E along with additional assumptions used to develop the cost estimate. In addition, the unit rates for disposal and transportation are also presented in Appendix E.

Table 4. Summary cost estimate for off-site disposal, including the five major cost elements along with the total estimated cost for off-site disposal.

Cost Elements	Current Cost Estimate (2001 dollars)
Capital	
Design	\$1,271,000
Construction	\$7,843,000
Operations total	\$449,617,000
Closure total	\$1,744,000
Post-closure total	\$0
Other total	\$4,500,000
Grand total	\$464,975,000

6. CONCLUSIONS

This section presents two types of comparisons for the cost of on-site versus off-site disposal of INEEL CERCLA waste. The first comparison is the cost of disposal including all costs associated with each of the five major cost elements as discussed above in Sections 4 and 5. In this comparison, the cost of on-site disposal is less than one-fifth the cost of off-site disposal (\$79.6 million versus \$465 million).

The second comparison is the cost of disposal per cubic yard of waste. For on-site disposal, the current estimate and FS Supplement Report estimate consider both the volumes of waste expected to be disposed without swell and the design volume for the ICDF. In the case of the off-site disposal option, both the current and FS Supplement Report estimate use the volumes expected to be disposed at the time of analysis without swell. This analysis is presented in Table 5.

Table 5. Comparison of the cost of on-site versus off-site disposal for both the current and FS Supplement Report estimates along with the calculated cost of disposal per cubic yard.

	Current On-Site Estimate	FS Supplement On-Site Estimate	Current Off-Site Estimate	FS Supplement Off-Site Estimate
Cost (\$)	79,627,000	181,248,000	464,975,000	548,371,000
Disposal volume (yd ³)	483,800	465,307	483,800	465,307
ICDF design volume (yd ³)	510,000	510,000	NA ^a	NA
Average cost of disposal for actual inventory (\$/yd ³)	165	390	961	1,179
Average cost of disposal for ICDF design volume (\$/yd ³)	156	355	NA	NA

a. NA = not applicable

As can be seen in Table 5, the cost of both on-site and off-site disposal have been significantly reduced.

Other comparisons illustrate the reductions in the cost of disposal for both on-site and off-site. For example, Table 6 presents the reduction in the cost of both on-site and off-site disposal from the time the FS Supplement was issued to the current time. As the table shows, both on-site and off-site disposal costs have been significantly reduced. This analysis shows that it is possible to reduce the cost of off-site disposal by 15% while using the correct waste types versus the GAO reduction of 22% by assuming that all of the waste is low-level waste. However, the cost of on-site disposal has been reduced to a much larger extent than for off-site disposal.

This last analysis shows that the ratio of cost between off-site versus on-site disposal has increased from approximately three times more expensive for off-site at the time the FS Supplement was issued to approximately six times more expensive today. The cost of off-site disposal could possibly be further reduced, but this would require additional characterization data and different assumptions concerning the waste types. However, it is not conceivable that the cost of off-site disposal could be reduced to the current cost of on-site disposal at the ICDF Complex.

Table 6. Comparison of the cost of on-site versus off-site disposal for both the current and FS Supplement Report estimates along with the calculated reductions in cost and the ratios of off-site to on-site disposal.

Current on-site estimate	\$79,627,000
FS Supplement on-site estimate	\$181,248,000
Current off-site estimate	\$464,975,000
FS Supplement off-site estimate	\$548,371,000
Cost reduction for on-site disposal from FS Supplement to current cost estimate	56%
Cost reduction for off-site disposal from FS Supplement to current cost estimate	15%
Ratio of off-site to on-site disposal using current estimate	6:1
Ratio of off-site to on-site disposal using FS Supplement	3:1

7. REFERENCES

- 10 CFR 830.120, 2000, "Quality Assurance Requirements," *Code of Federal Regulations*, Office of the Federal Register, January 2000.
- 40 CFR 262, 2000, "Standards applicable to generators of hazardous waste," *Code of Federal Regulations*, Office of the Federal Register, July 2000.
- 42 USC § 2011 et seq., "Atomic Energy Act of 1954," as amended, United States Code.
- DOE, 1999, *Commercial Disposal Policy Analysis for Low-Level and Mixed Low-Level Wastes*, U.S. Department of Energy, Office of Environmental Management, March 9, 1999.
- DOE O 435.1, 1999, "Radioactive Waste Management," July 1999.
- DOE-ID, 1998a, *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEL - Part B, Feasibility Study Supplement Report*, U.S. Department of Energy, Idaho Operations Office, DOE/ID-10619, Rev. 2, October 1998.
- DOE-ID, 1998b, *Proposed Plan for Waste Area Group 3 at the Idaho Chemical Processing Plant, Idaho National Engineering and Environmental Laboratory*, U.S. Department of Energy, Idaho Operations Office, October 1998.
- DOE-ID, 1999, *Final Record of Decision Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13, Idaho National Engineering and Environmental Laboratory*, U.S. Department of Energy, Idaho Operations Office, DOE/ID-10660, Rev. 0, October 1999.
- DOE-ID, 2000a, *Staging Storage, Sizing, and Treatment Facility (SSSTF) 30% Design*, U.S. Department of Energy, Idaho Operations Office, DOE/ID-10825, Books 1-3, Rev. 0, December 2000.
- DOE-ID, 2000b, *CERCLA Waste Inventory Database Report for the Operable Unit 3-13 Waste Disposal Complex*, U.S. Department of Energy, Idaho Operations Office, DOE/ID-10803, Rev. 0, December 2000.

- DOE-ID, 2001a, *INEL CERCLA Disposal Facility - Title I (30%) Design*, U.S. Department of Energy, Idaho Operations Office, DOE/ID-10847, Rev. 0, July 2001.
- DOE-ID, 2001b, "Remedial Design/Remedial Action Work Plan for the Waste Area Group 3 Staging Storage, Sizing, and Treatment Facility (Draft)," DOE/ID-10889, Rev. Draft, August 2001.
- Envirocare, 1998, *Contract between Envirocare and DOE Ohio Field Office for the Disposal of Low-Level Waste*, Envirocare of Utah, DE-AM24-98OH20053, June 30, 1998.
- GAO, 2000, *Low-Level Radioactive Wastes, Department of Energy Has Opportunities to Reduce Disposal Costs*, U.S. General Accounting Office, GAO/RCED-00-64, April 2000.
- GAO, 2001, *Nuclear Cleanup, DOE Should Reevaluate Waste Disposal Options Before Building New Facilities*, U.S. General Accounting Office, GAO-01-441, May 2001.
- LMITCO, 1995, *Waste Management Facilities Cost Information for Transportation of Radioactive and Hazardous Materials*, Lockheed Martin Idaho Technologies Company, INEL-95/0300, Rev. 1, June 1995.
- Shadley, Jeffrey T. (shadlejt@inel.gov), "Envirocare contract cost info," Talley W. Jenkins (jenkintw@inel.gov), March 9, 2001.

Appendix A

**Feasibility Study Supplement Report Release Site Waste
Classifications**

Appendix A

Feasibility Study Supplement Release Site Waste Classifications

Table A-1. Contaminant and media type information used for the development of the Operable Unit 3-13 Feasibility Study Supplement Report on-site and off-site cost estimates.

Release Site	Contamination and Media Type
TSF-06	Soil contaminated with radionuclides and potentially characteristic for Hg
TSF-07	Soil contaminated with radionuclides and potentially characteristic for Cr, Pb, Hg, Se, and Ag
TSF-08	Contaminated soil that is potentially characteristic for Hg
TSF-09/18	Soil contaminated with radionuclide and having listed waste for organics and potential PCB issues
TSF-21	Concrete debris contaminated with radionuclides and having listed waste for organics issues
TSF-26	Soil contaminated with radionuclides and having listed waste for organics issues
CPP-01/04/05	Soil contaminated with radionuclides
CPP-03	Soil contaminated with radionuclides
CPP-08/09	Soil contaminated with radionuclides
CPP-10	Soil contaminated with radionuclides
CPP-11	Soil contaminated with radionuclides
CPP-13	Soil contaminated with radionuclides and having listed waste issues
CPP-14	Soil contaminated with radionuclides and potentially characteristic for Hg and Pb along with PCB issues
CPP-19	Soil contaminated with radionuclides
CPP-34	Soil contaminated with radionuclides and potentially characteristic for Pb and listed waste issues
CPP-35	Soil contaminated with radionuclides and potentially characteristic for Hg and listed waste issues
CPP-36/91	Soil contaminated with radionuclides and potentially characteristic for Hg and listed waste issues
CPP-44	Contaminated soil that is potentially characteristic for Cr, Pb, and Hg
CPP-55	Contaminated soil that is potentially characteristic for Hg
CPP-67	Soil contaminated with radionuclides and potentially characteristic for RCRA metals and potential listed waste issues
CPP-69	Concrete debris contaminated with radionuclides and potentially characteristic for RCRA metals and organics

Table A-1. (continued).

Release Site	Contamination and Media Type
CPP-92	Soil contaminated with radionuclides and having listed waste issues
CPP-93	Contaminated soil that is potentially characteristic for Hg
CPP-94	Contaminated soil (86%) and debris (14%) having hazardous constituents (HF)
CFA-04	Soil contaminated with radionuclides and potentially characteristic for Hg
CFA-08	Soil contaminated with radionuclides and having PCB issues
CFA-10	Contaminated soil that is potentially characteristic for Cr and Hg along with PCBs
CFA-12	Soil contaminated with radionuclides
ARA-12	Soil contaminated with radionuclides and potentially characteristic for Cr and Pb
ARA-23	Soil contaminated with radionuclides
OU 10-02	Soil contaminated with radionuclides
BORAX-01	Soil contaminated with radionuclides and having potential RCRA metal issues
LCCDA-01	Soil contaminated with radionuclides and potentially characteristic for acids
LCCDA-02	Soil contaminated with radionuclides and potentially characteristic for acids
WAG 1 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model
WAG 2 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model
WAG 3 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model
WAG 4 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model
WAG 5 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model
WAG 6 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model
WAG 7 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model
WAG 10 D&D&D	Contaminated debris with classification of waste streams based on the D&D&D parametric model

Appendix B

Feasibility Study Supplement Report
Release Site Waste Volumes

Appendix B

Feasibility Study Supplement Report Release Site Waste Volumes

Table B-1. Release site waste volumes used for development of the Operable Unit 3-13 Feasibility Study Supplement Report on-site and off-site cost estimates.

Release Site	Volume (yd ³)	Volume LLW Soils (yd ³)	Volume MLLW Soils (yd ³)	Volume Hazardous Waste Soils (yd ³)	Volume LLW Debris (yd ³)	Volume MLLW Debris (yd ³)	Volume Hazardous Waste Debris (yd ³)
TSF-06	5,000	—	5,000	—	—	—	—
TSF-07	62,326	—	62,326	—	—	—	—
TSF-08	150	—	—	150	—	—	—
TSF-09/18	1,500	—	1,500	—	—	—	—
TSF-21	30	—	—	—	—	30	—
TSF-26	5,100	—	5,100	—	—	—	—
CPP-01/04/05	3,664	3,664	—	—	—	—	—
CPP-03	568	568	—	—	—	—	—
CPP-08/09	3,886	3,886	—	—	—	—	—
CPP-10	2,301	2,301	—	—	—	—	—
CPP-11	916	916	—	—	—	—	—
CPP-13	1,791	—	1,791	—	—	—	—
CPP-14	137	—	137	—	—	—	—
CPP-19	3,496	3,496	—	—	—	—	—
CPP-34	19,183	—	19,183	—	—	—	—
CPP-35	2,711	—	2,711	—	—	—	—
CPP-36/91	6,540	—	6,540	—	—	—	—
CPP-44	89	—	—	89	—	—	—
CPP-55	370	—	—	370	—	—	—
CPP-67	33,168	—	33,168	—	—	—	—
CPP-69	59	—	—	—	—	59	—
CPP-92	2,943	—	2,943	—	—	—	—
CPP-93	654	—	—	654	—	—	—
CPP-94	9	—	—	8	—	—	1

Table B-1. (continued).

Release Site	Volume (yd ³)	Volume LLW Soils (yd ³)	Volume MLLW Soils (yd ³)	Volume Hazardous Waste Soils (yd ³)	Volume LLW Debris (yd ³)	Volume MLLW Debris (yd ³)	Volume Hazardous Waste Debris (yd ³)
CFA-04	8,227	—	8,227	—	—	—	—
CFA-08	73,771	—	73,771	—	—	—	—
CFA-10	161	—	—	161	—	—	—
CFA-12	55	55	—	—	—	—	—
ARA-12	103	—	103	—	—	—	—
ARA-23	55,705	55,705	—	—	—	—	—
OU 10-02	1,308	1,308	—	—	—	—	—
BORAX-01	5	—	5	—	—	—	—
LCCDA-01	196	—	196	—	—	—	—
LCCDA-02	196	—	196	—	—	—	—
WAG 1 D&D&D	8,518	—	—	—	8,476	21	21
WAG 2 D&D&D	30,353	—	—	—	30,268	37	48
WAG 3 D&D&D	47,019	—	—	—	46,915	48	55
WAG 4 D&D&D	552	—	—	—	549	1	1
WAG 5 D&D&D	10,923	—	—	—	10,907	5	11
WAG 6 D&D&D	0	—	—	—	—	—	—
WAG 7 D&D&D	71,609	—	—	—	71,461	50	98
WAG 10 D&D&D	12	—	—	—	—	—	12
Total	465,307	71,898	222,900	1,432	168,577	252	247
— = No waste type at this location.							

Appendix C
On-Site Disposal Cost Estimate

Appendix C

On-Site Disposal Cost Estimate

Table C-1. Detailed cost estimate for on-site disposal at the ICDF Complex.

Item	Cost	Corresponding Project
Design Costs		
RD/RA SOW (soils disposal portion)	\$250,000	Waste Area Group 3
Safety analysis documentation	\$33,000	SSSTF and ICDF
Prefinal inspection report	\$36,000	SSSTF and ICDF
ICDF preliminary (10% conceptual) design	\$1,006,000	ICDF
Design support	\$61,000	ICDF
Modeling for Title design	\$382,000	ICDF
ICDF Title I (30%) design	\$918,000	ICDF
ICDF RD/RA WP, including Title II (90%) design	\$2,196,000	ICDF
SSSTF design (original conceptual & Title I design)	\$2,281,000	SSSTF
SSSTF Phase 1 design (RD/RA WP), including Title II (90%) design	\$747,000	SSSTF
Composite analysis	\$541,000	ICDF
Total Design Costs:		<u>\$8,451,000</u>
Construction Costs		
Construction procurement	\$221,000	SSSTF and ICDF
Construction quality assurance procurement	\$48,000	ICDF
ICDF landfill construction (Cells 1 & 2)	\$13,330,000	ICDF
Monitoring well installation	\$707,000	ICDF
Road work	\$290,000	SSSTF
Utilities	\$1,360,000	SSSTF
Administrative facility	\$230,000	SSSTF
Scales	\$186,000	SSSTF
Decon facility	\$1,552,000	SSSTF
Treatment equipment	\$1,340,000	SSSTF
Waste tracking system	\$217,000	SSSTF
Contractor overheads	\$605,000	SSSTF and ICDF
Construction QA/QC for ICDF & SSSTF	\$1,766,000	SSSTF and ICDF
Project management	\$1,286,000	SSSTF and ICDF
Construction authorization and work control	\$38,000	SSSTF and ICDF
Total Construction Costs:		<u>\$23,176,000</u>

Table C-1. (continued).

Item	Cost	Corresponding Project
Operation Costs		
ICDF/SSSTF Startup		
Testing and turnover planning	\$25,000	SSSTF and ICDF
SO testing support	\$14,000	SSSTF and ICDF
O&R review	\$299,000	SSSTF and ICDF
Operator training	\$39,000	SSSTF and ICDF
SSSTF operating procedures	\$82,000	SSSTF
ICDF operating procedures	\$35,000	ICDF
O&M manual development	\$86,000	SSSTF and ICDF
IWTS operating interface manual	\$192,000	SSSTF
Total ICDF/SSSTF Startup:	<u>\$772,000</u>	
ICDF/SSSTF Operating Equipment		
ICDF/SSSTF fleet equipment	\$2,565,000	SSSTF and ICDF
ICDF/SSSTF Operations (10 yrs)		
Office and scales	\$9,226,000	ICDF
Sampling technicians	\$244,000	ICDF
Stabilization	\$2,751,000	ICDF
SSSTF maintenance	\$700,000	ICDF
SSSTF G&A on spare parts purchase	\$47,000	ICDF
Landfill operations	\$4,000,000	ICDF
ICDF maintenance	\$641,000	ICDF
ICDF G&A on spare parts purchase	\$45,000	ICDF
Total ICDF/SSSTF Operations:	<u>\$17,654,000</u>	
Project Management		
Project management	<u>\$495,000</u>	ICDF
Total Operation Costs:	<u>\$21,486,000</u>	

Table C-1. (continued).

Item	Cost	Corresponding Project
Closure Costs		
SSSTF D&D		
Characterization	\$96,000	ICDF
Project preparation	\$76,000	ICDF
D&D preparation	\$45,000	ICDF
Facility project operations	\$333,000	ICDF
Facility D&D	\$451,000	ICDF
Disposal and transportation	\$38,000	ICDF
Project management and support	\$497,000	ICDF
Post D&D	\$24,000	ICDF
Total SSSTF D&D:	<u>\$1,560,000</u>	
ICDF Closure		
Construction procurement	\$81,000	ICDF
Construction quality assurance procurement	\$49,000	ICDF
ICDF landfill engineered barrier construction	\$6,840,000	ICDF
Construction QA/QC for ICDF closure	\$616,000	ICDF
Project management	\$684,000	ICDF
Construction authorization and work control	\$15,000	ICDF
Total ICDF Closure:	<u>\$8,285,000</u>	
Project Management		
Project management	\$124,000	ICDF
Total Closure Costs:	<u>\$9,969,000</u>	
Post-Closure S&M Costs		
ICDF post-closure leachate (30 yr) and aquifer monitoring (100 yr)	\$1,584,000	ICDF
Post-closure leachate management (30 yr)	\$3,786,000	ICDF
Facility surveillance and maintenance	\$1,500,000	ICDF
Project management	\$1,125,000	ICDF
Total Post-Closure S&M Costs:	<u>\$7,995,000</u>	
Other Costs		
Program management (100 yr)	\$8,550,000	ICDF
Total Other Costs:	<u>\$8,550,000</u>	
Total Life-Cycle Project Costs: \$79,627,000		

Appendix D

Feasibility Study Supplement Report
On-Site Disposal Cost Estimate

Appendix D

Feasibility Study Supplement Report On-Site Disposal Cost Estimate

Table D-1. Operable Unit 3-13 Feasibility Study Supplement Report summary cost estimate for on-site disposal at the ICDF Complex, including the five major cost elements along with the total estimated cost for on-site disposal.

Cost Elements	Feasibility Study Cost Estimate (1998 dollars)
Capital total	\$39,985,000
Operations total	\$17,513,000
Closure total	\$69,353,000
Post-closure total	\$19,138,000
Other costs total	\$35,258,000
Grand total	\$181,248,000

Table D-2. OU 3-13 FS Supplement Report cost estimate for on-site disposal at the ICDF Complex including the five major cost element and associated sub-elements and total estimated cost for on-site disposal.

Cost Elements	Feasibility Study Cost Estimate (1998 dollars)
Capital Costs	
RD/RA SOW	\$54,000
RA work plan	\$63,000
Packaging, shipping, and transportation	
Remedial action report	\$48,000
Safety analysis documentation	\$101,000
Prefinal inspection report	\$8,000
Remedial design (Title design)	\$667,000
Procurement fees	\$572,000
Construction subcontract	\$22,875,000
Project management	\$500,000
G&A and PIF allowance	\$8,235,000
Construction management	\$6,863,000
Capital total:	\$39,985,000
Operation Costs	
Operations subcontract	\$7,521,000
Procurement fee for operation	\$188,000

Table D-2. (continued).

Cost Elements	Feasibility Study Cost Estimate (1998 dollars)
G&A and PIF allowance	\$2,775,000
Operational perched water	\$958,000
Operational leachate monitor	\$312,000
Project management	\$750,000
Construction management	\$2,009,000
Certified record storage	\$3,000,000
Operations total:	\$17,513,000
Closure Costs	
CAP construction subcontract	\$41,011,000
Procurement fee for CAP construction	\$1,025,000
G&A and PIF allowance	\$14,764,000
Project management	\$250,000
Construction management	\$12,303,000
Closure total:	\$69,353,000
Post-closure Surveillance and Maintenance Costs	
Closure SRPA monitoring	\$5,632,000
Closure perched water monitoring	\$225,000
Closure leachate monitoring	\$460,000
Continued caretaker/maintenance	\$12,820,000
Post-closure total:	\$19,138,000
Other Costs	
Treatment subcontract including	\$12,671,000
Procurement fee for treatment	\$317,000
G&A and PIF allowance for treatment	\$4,562,000
Construction management for treatment	\$3,801,000
5-yr reviews (100 yr)	\$3,243,000
Added institutional controls	\$640,000
Waste characterization	\$6,641,000
Program management (100 yr)	\$3,384,000
Other total:	\$35,258,000
Grand total:	\$181,248,000

Appendix E
Off-Site Disposal Cost Estimate

Appendix E

Off-Site Disposal Cost Estimate

Table E-1. Detailed cost estimate for off-site disposal.

Item	Cost	Description/Assumptions
Design Costs		
RD/RA SOW (soils disposal portion)	\$125,000	Assumed to be 50% of the cost for the ICDF/SSSTF due to elimination of a major issue concerning the ICDF landfills
Pre-Final Inspection Report	\$18,000	Assumed to be 50% of the cost for the ICDF/SSSTF
Loadout facility, utilities, and infrastructure preliminary (10% conceptual) design	\$151,000	Assumed to be 15% of the cost for the ICDF conceptual design due to the level of complexity
Loadout facility, utilities, and infrastructure Title I (30%) design	\$230,000	Assumed to be 25% of the cost for the ICDF conceptual design due to the level of complexity
Loadout facility, utilities, and infrastructure RD/RA WP, including Title II (90%) design	\$747,000	Assumed to be similar to the SSSTF Phase 1 RD/RA WP and associated design cost
Total Design Costs:	<u>\$1,271,000</u>	
Construction Costs		
Construction procurement	\$150,000	Assume to require 2 FTEs 4 months to develop and issue the RFP and then 2 FTEs for 2 months to award the contract including the bid cycle
Road work	\$290,000	Assumed same as SSSTF
Utilities	\$1,359,000	Assumed same as SSSTF
Administrative facility	\$230,000	Assumed same as SSSTF
Scales	\$465,000	Assumed 2 1/2 times the SSSTF due to additional scales associated with railcars
Loadout and decontamination facilities	\$2,272,000	Assumed same as decontamination facility plus \$720K for concrete loading area
Railroad spur	\$772,000	1.4 miles of railroad track to be installed for loadout facility, including tie-into existing railroad track and staging spur (estimated at \$500,000 per mile plus 12,000 yd ³ @ \$6/yd ³ for roadbed material)
Waste tracking system	\$217,000	Assumed same as SSSTF
Contractor overheads	\$605,000	Assumed same as SSSTF
Construction QA/QC	\$311,000	Assumed to be 5% of the construction cost
Project management	\$656,000	1.75 FTE for 2.5 years for design and construction
Construction management	\$497,000	Assumed to be 8% of the cost of construction of the Loadout facility, utilities, and infrastructure
Construction authorization & work control	<u>\$19,000</u>	Assumed 50% of SSSTF/ICDF cost
Total Construction Costs:	<u>\$7,843,000</u>	

Table E-1. (continued).

Item	Cost	Description/Assumptions
Operation Cost		
Off-Site Disposal Startup		
Testing and turnover planning	\$13,000	Assumed 50% of SSSTF/ICDF cost
S O testing support	\$7,000	Assumed 50% of SSSTF/ICDF cost
O&R review	\$149,000	Assumed 50% of SSSTF/ICDF cost
Operator training	\$39,000	Assumed same as SSSTF/ICDF cost
SSSTF operating procedures	\$82,000	Assumed same as SSSTF cost
ICDF operating procedures	\$0	None
O&M manual development	\$26,000	Assumed 30% of SSSTF/ICDF cost
IWTS operating interface manual	\$192,000	Assumed same as SSSTF/ICDF cost
Total Startup:	<u>\$508,000</u>	
Off-Site Disposal Operating Equipment		
Off-site disposal fleet equipment	\$770,000	Assumed 30% of SSSTF/ICDF fleet since landfill equipment is not required
Off-Site Disposal Operations		
Office and scales	\$9,226,000	Assumed same as SSSTF/ICDF cost
Sampling technicians	\$750,000	2 sampling technicians (1 day per week for 10 yrs)
Loadout facility operations	\$6,000,000	4 FTEs (2 HPs, 1 Operator, and 1 laborer) for 10 yrs
Loadout and equipment maintenance	\$193,000	Assumed 25% of the Fleet Equipment cost
G&A (loadout and equipment maintenance parts)	\$13,000	Assumed 7% of the Equipment Maintenance cost
Total Off-Site Disposal Operations:	<u>\$16,182,000</u>	
Transportation & Disposal		
Transportation (LLW soils to disposal facility)	\$925,000	Assumed 84,195 yds ³ @ \$10.99/yd ³ - note 1
Disposal (LLW)	\$11,818,000	Assumed 84,195 yds ³ @ \$140.37/yd ³ - note 2
Transportation (MLLW soils to disposal facility)	\$3,190,000	Assumed 290,156 yds ³ @ \$10.99/yd ³ - note 1
Disposal (MLLW)	\$254,757,000	Assumed 290,156 yds ³ @ \$878/yd ³ (LDR compliant MLLW) - note 3
Transportation (nonhazardous waste soils to disposal facility)	\$99,000	Assumed 8,999 yds ³ @ \$10.99/yd ³ - note 1
Disposal (nonhazardous waste soils)	\$1,263,000	Assumed 8,999 yds ³ @ \$140.37/yd ³ (LLW disposal cost) - note 2
Transportation (hazardous waste soils to disposal facility)	\$39,000	Assumed 3,556 yds ³ @ \$10.99/yd ³ - note 1
Disposal (hazardous waste soils)	\$22,275,000	Assumed 3,556 yds ³ @ \$6,264/yd ³ (ash stabilization & disposal) - note 3

Table E-1. (continued).

Item	Cost	Description/Assumptions
Transportation (LLW debris to disposal facility)	\$778,000	Assumed 70,721 yds ³ @ \$10.99/yd ³ - note 1
Disposal (LLW debris)	\$28,086,000	Assumed 70,721 yds ³ @ \$397.14/yd ³ - note 2
Transportation (MLLW debris to disposal facility)	\$288,000	Assumed 26,156 yds ³ @ \$10.99/yd ³ - note 1
Disposal (MLLW debris)	\$88,983,000	Assumed 26,156 yds ³ @ \$3,402/yd ³ (lead/debris macro & disposal) - note 3
Transportation (hazardous waste debris to disposal facility)	\$0	Assumed 17 yds ³ @ \$10.99/yd ³ - note 1
Disposal (hazardous waste debris)	\$58,000	Assumed 17 yds ³ @ \$3,402/yd ³ (lead/debris macro & disposal) - note 3
Waste characterization	\$19,103,000	Assumed to consist of 1 composite sample per railcar (7,641 railcars) @ \$2,500/sample to meet Envirocare's WAC
Procurement fee for operations, transportation, and disposal	\$0	
Project management	\$495,000	0.33 FTE for 10 yrs
Total Transportation & Disposal:	<u>\$432,157,000</u>	
Total Operations Cost:	<u>\$449,617,000</u>	

Closure Costs**Loadout Facility D&D**

Characterization	\$115,000	Increased from SSSTF work scope due to increased size of loadout concrete pads
Project preparation	\$76,000	Same amount of work required as for the SSSTF D&D activities
D&D preparation	\$45,000	Same amount of work required as for the SSSTF D&D activities
Facility project operations	\$400,000	Increased from SSSTF work scope due to increased size of loadout concrete pads
Facility D&D	\$541,000	Increased from SSSTF work scope due to increased size of loadout concrete pads
Disposal and transportation	\$46,000	Increased from SSSTF work scope due to increased size of loadout concrete pads
Project management and support	\$497,000	Same amount of work required as for the SSSTF D&D activities
Post D&D	\$24,000	Same amount of work required as for the SSSTF D&D activities
Total Closure Costs:	<u>\$1,744,000</u>	

Table E-1. (continued).

Item	Cost	Description/Assumptions
Post-closure S&M Costs		
Post-closure S&M costs	\$0	
Total Post-closure S&M Costs:	\$0	
Other Costs		
Program management (15 yrs)	\$4,500,000	2 FTEs for 15 years
Total Other Costs:	\$4,500,000	
Total Life-Cycle Project Costs:	\$464,975,000	

1. LMITCO, 1995, *Waste Management Facilities Cost Information for Transportation of Radioactive and Hazardous Materials*, Lockheed Martin Idaho Technologies Company, INEL-95/0300, Rev. 1, June 1995.
2. Envirocare, 1998, *Contract between Envirocare and DOE Ohio Field Office for the Disposal of Low-Level Waste*, Envirocare of Utah, DE-AM24-98OH20053, June 30, 1998.
3. Shadley, Jeffrey T. (shadlejt@inel.gov), "Envirocare contract cost info," Talley W. Jenkins (jenkintw@inel.gov), March 9, 2001.

Appendix F

Feasibility Study Supplement Report
Off-Site Disposal Cost Estimate

Appendix F

Feasibility Study Supplement Report Off-Site Disposal Cost Estimate

Table F-1. Operable Unit 3-13 Feasibility Study Supplement Report summary cost estimate for off-site disposal, including the five major cost elements along with the total estimated cost for off-site disposal.

Cost Elements	Feasibility Study Cost Estimate (1998 dollars)
Capital total	\$7,807,000
Operations total	\$531,795,000
Closure total	\$1,987,000
Post-closure total	\$0
Other cost total	\$6,782,000
Grand total	\$548,371,000

Table F-2. Operable Unit 3-13 Feasibility Study Supplement Report cost estimate for off-site disposal, including the five major cost elements and associated sub-elements along with the total estimated cost for off-site disposal.

Cost Elements	Feasibility Study Cost Estimate (1998 dollars)
Capital Costs	
RD/RA SOW	\$54,000
RA work plan	\$63,000
Packaging, shipping, and transportation	\$156,000
Remedial action report	\$48,000
Safety analysis documentation	\$101,000
Prefinal inspection report	\$8,000
Remedial design (Title design)	\$361,000
Procurement fees	\$100,000
Construction subcontract	\$4,016,000
Project management	\$250,000
G&A and PIF allowance	\$1,446,000
Construction management	\$1,205,000
Capital total:	\$7,807,000

Table F-2. (continued).

Cost Elements	Feasibility Study Cost Estimate (1998 dollars)
Operations Costs	
Operations subcontract	\$315,086,000
Procurement fee for operations, transportation, and disposal	\$7,877,000
G&A and PIF allowance	\$113,431,000
Project management	\$875,000
Construction management	\$94,526,000
Operations total:	\$531,795,000
Closure Costs	
Loadout facility, utilities, and infrastructure D&D construction subcontract	\$1,105,000
Procurement fee for loadout facility D&D	\$28,000
G&A and PIF allowance	\$398,000
Project management	\$125,000
Construction management	\$332,000
Closure total:	\$1,987,000
Post-closure Surveillance and Maintenance Costs	
Post-closure total:	\$0
Other Costs	
5-yr review	\$141,000
Waste characterization	\$6,641,000
Other total:	\$6,782,000
Grand total:	\$548,371,000